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SHELLFISH INDUSTRY. EQUIPMENT CONSTRUCTION GUIDES

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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

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SHELLFISH INDUSTRY

Equipment Construction Guides

Developed for use with the
Public Health Service-States-Industry
Cooperative Program for the
Certification of Interstate Shellfish Shippers

Compiled and Edited by
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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Environmental Engineering and Food Protection
Washington 25, D. C.

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INTRODUCTION

Since 1925 the Public Health Service, the States, and the shellfish industry have cooperated in a program designed to maintain a high level of sanitation in the growing, harvesting, and processing of oysters, clams, and mussels to be marketed as a fresh or frozen product. The basic sanitary standards used in this program are fully described in PHS Publication No. 33, Manual of Recommended Practice for Sanitary Control of the Shellfish Industry, Parts I and II. General construction and cleanability standards for equipment used by the shellfish industry are an integral part of these basic standards.

The need for more specific construction guides for equipment used by the shellfish industry was reviewed at the 1958 Shellfish Sanitation Workshop,[1] and the Public Health Service was requested to initiate development of such guides. In accord with the request, the Public Health Service developed initial drafts of equipment construction guides. Agencies and organizations which received these initial drafts and thus contributed to the development of the completed construction guides included: Interested State agencies, Oyster Institute of North America, Bureau of Commercial Fisheries, Food and Drug Administration, Canadian Department of National Health and Welfare, and two equipment manufacturing companies. The completed construction guides were reviewed and adopted by the 1961 National Shellfish Sanitation Workshop.

It is the purpose of this guide to describe construction and fabrication procedures which will insure that blower tanks, skimmers, returnable shipping containers, and shellfish shucking buckets and pans will meet the equipment construction standard of the Cooperative Program and also the functional needs of industry. However, the development of new methods of equipment construction or fabrication is also encouraged. Therefore, shellfish equipment specifications heretofore or hereafter developed which so differ in design, material, fabrication, or otherwise as not to conform with the following standards, but which in the fabricator's opinion are equivalent to or better may be submitted for consideration. Correspondence relative to such standards should be directed to Shellfish Sanitation Program, Division of Environmental Engineering and Food Protection, Public Health Service, Washington 25, D.C.

SCOPE

This guide covers the sanitary construction aspects of (1) shellfish blower tanks, including the sanitary piping for air, water, and drain lines, (2) the stand-supported skimmer, including the supporting stand, (3) returnable shipping containers, (4) shellfish shucking buckets, and (5) shellfish shucking pans.

DEFINITIONS

(1) *Shellfish*—All edible species of oysters, clams, or mussels. Shellfish products which contain any material other than the meats and/or shell liquor of oysters, clams, or mussels will be regarded as a "processed food" and will not be included in the Cooperative Program. (For the purpose of this guide, the term does not include crabs, shrimps, or lobsters.)

(2) *Shucked Shellfish*—Shellfish, or parts thereof, which have been removed from their shells.

(3) *Product*—Shucked shellfish which are either held, shipped, washed, and/or drained in this equipment.

(4) *Product Contact Surface*—All surfaces that are exposed to the product, or surfaces from which liquid may drain, drop, or be drawn into the product.

(5) *Non-Product Contact Surfaces*—All other surfaces not included in (4) above.

[1] Proceedings, 1958 Shellfish Sanitation Workshop, U.S. Public Health Service, Washington 25, D.C.

(6) *Blower*—A tank-like device for the immersion washing of shucked shellfish. Air may be introduced at the bottom of the tank to produce agitation.

(7) *Drain gate and chute*—The tank opening through which the washed shellfish are discharged.

(8) *Drain valve*—The valve through which the wash water is released to the floor or waste line.

(9) *Skimmers*—The stand-supported, perforated tray in which shucked shellfish are spray washed and/or drained.

(10) *Skimmer Paddle*—The utensil used as the gate on the skimmer exit chute and/or one used to scrape the product through the exit chute.

(11) *Returnable Shipping Container*—Multiple use containers for holding or shipping of shucked shellfish.

(12) *Shellfish Shucking Bucket*—Containers for temporarily holding shucked shellfish during the shucking process.

(13) *Shellfish Shucking Pan*—Containers for temporarily holding shucked shellfish during the shucking process.

(14) *Welds*—Permanent seams and joints.

BLOWER TANK

A. Material

(1) All product-contact surfaces shall be of A.I.S.I.[2] Type No. 302 stainless steel or equally corrosion-resistant metal that is nontoxic and nonabsorbent except that:

(a) Plastic materials may be used for the blower tank drain gate and drain valve. These materials shall be relatively inert, resistant to scratching, scoring, and distortion by the temperature, chemicals, and methods to which they are normally subjected in operation, or by cleaning and bactericidal treatment. They shall be nontoxic, fat resistant, relatively nonabsorbent, relatively insoluble, and shall not release component chemicals or impart a flavor to the product.[3]

(b) Rubber and rubber-like materials may be used for blower tank paddles or gate, drain gate, and drain valve. These materials shall be relatively inert, resistant to scratching, scoring, and distortion by the temperature, chemicals, and methods to which they are normally subjected in operation, or by cleaning and batericidal treatment. They shall be nontoxic, fat resistant, relatively nonabsorbent, relatively insoluble and shall not release component chemicals, nor impart a flavor to the product.[3]

(2) All nonproduct contact surfaces shall be of inherently corrosion-resistant material, shall be rendered corrosion-resistant, or shall be painted. Surfaces to be painted shall be effectively prepared for painting; and the paint used shall adhere, be relatively nonabsorbent, and shall provide a smooth, cleanable, and durable surface. Parts having both product-contact and non-product-contact shall not be painted.

B. Fabrication

(1) All product-contact surfaces shall be at least as smooth as No. 4 mill finish on stainless steel sheets.

(2) All seams in product-contact surfaces shall be welded with the welds ground smooth and polished to not less than a No. 4 finish. All outside seams shall be smooth and waterproof. All weld areas and deposited weld material shall be substantially as corrosion-resistant as the parent metal.

(3) All appurtenances, including drain gates and chutes having product-contact surfaces, shall be easily removable for cleaning, or shall be readily cleanable in place.

(4) All product-contact surfaces shall be easily accessible, visible, and readily cleanable, either when in an assembled position or when removed.

(5) All internal angles of 135° or less on product-contact surfaces shall have minimum radii of ¼ inch, except that minimum radii for fillets or welds in product-contact surfaces may be smaller for essential functional reasons. In no case shall radii be less than ⅛ inch.

[2] American Iron and Steel Institute.

[3] Plastic, rubber, and rubber-like materials used for equipment may be subject to the Food Additives Amendment to the Federal Food, Drug, and Cosmetic Act. The acceptability of such materials under the Food Additives Amendment shall be obtained from equipment manufacturers.

(6) All sanitary pipe fittings shall conform to "3–A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment," and supplements thereto.[4]

(7) Nonproduct-contact surfaces shall have a smooth finish, be free of pockets and crevices, and readily cleanable.

(8) Legs shall be of sufficient length to provide at least 12 inches clearance between the lowest fixed point of the tank and the floor, shall be smooth with rounded ends, and shall have no exposed threads. If legs are of hollow tube stock, they shall be effectively sealed.

(9) All threads on product-contact surfaces shall comply with specifications for threads contained in the 3–A Sanitary Standards for Fittings.[4]

(10) External and internal sections of the air pipe shall be easily cleanable to a point at least two inches above the tank overflow level.

(11) The false bottom shall be so constructed as to be rigid and, in any event, of at least 16 U.S. standard gage stainless steel, or equivalent material.

(12) Perforations or slots in the false bottom shall be not less than $\frac{3}{16}$ inch in the minimum diameter and the end radius of the perforations shall be not less than $\frac{3}{32}$ inch. After perforation, the flat surface of the sheet from which the perforating punch or drill emerges on the down stroke shall be polished to the equivalent of not less than a No. 4 mill finish.

(13) Air lines shall be of easily cleanable construction to a point two inches above the tank overflow.

(14) Wire mesh shall not be used.

(15) The blower tank shall be constructed so that it will not buckle or sag and so that it will be self-draining. Product-contact surfaces shall be constructed of not less than 16 U.S. standard gage stainless steel or equivalent material.

(16) Maximum dimension of the tank from point of overflow to drain valve flange shall not exceed 40 inches.

(17) Drain valves and flange shall comply with the 3–A Sanitary Standards for Fittings used on Milk and Milk Products Equipment. The flange shall be welded to the body of the blower tank.

(18) There shall be no exposed screw, bolt or rivet heads on product-contact surfaces.

SKIMMERS

A. Material

(1) All product-contact surfaces shall be of A.I.S.I. type No. 302 stainless steel, or equally corrosion-resistant metal that is nontoxic and nonabsorbent, except that:

(a) Suitable plastic materials or rubber and rubber-like materials may be used for the skimmer paddle or gate. These materials shall be relatively inert, resistant to scratching, scoring, and distortion by temperature, chemicals, and methods to which they are normally subjected in operation, or by cleaning and bactericidal treatment. They shall be nontoxic, fat resistant, relatively nonabsorbent, relatively insoluble, and shall not release component chemicals nor impart a flavor to the product.[3]

(2) All nonproduct-contact surfaces shall be of inherently corrosion-resistant material, shall be rendered corrosion-resistant, and except for funnel drain, shall be painted. Surfaces to be painted shall be effectively prepared for painting and the paint used shall adhere, be relatively nonabsorbent, and shall provide a smooth, cleanable, and durable surface. Parts having both product-contact and nonproduct-contact surfaces shall not be painted.

B. Fabrication

(1) All product-contact surfaces shall be at least as smooth as a No. 4 mill finish on stainless steel sheets.

(2) All seams in product-contact surfaces shall be welded with the welds ground smooth and polished to not less than a No. 4 mill finish. All outside seams shall be smooth and waterproof. All weld areas and deposited weld metal shall be substantially as corrosion resistant as the parent metal.

[3] Plastic, rubber, and rubber-like materials used for equipment may be subject to the Food Additives Amendment to the Federal Food, Drug, and Cosmetic Act. The acceptability of such matrials under the Food Additives Amendment shall be obtained from equipment manufacturers.

[4] Sanitary standards describing the construction of valves, fittings, and pumps may be obtained from International Association of Milk and Food Sanitarians, Inc., Box 347, Shelbyville, Indiana.

(3) All appurtenances having product-contact surfaces shall be easily removable for cleaning, or shall be readily cleanable in place.

(4) All product-contact surfaces shall be easily accessible, visible, and readily cleanable, either when in an assembled position or when removed. The skimmer shall be demountable from the supporting stand for cleaning.

(5) All internal angles of 135° or less on product-contact surfaces shall have minimum radii of ¼ inch, except that minimum radii for fillets of welds in product-contact surfaces may be smaller for essential functional reasons.

(6) The skimmer shall be constructed so that it will not buckle or sag while in use, so that both the perforated area and drainage funnel are self-draining, and so as to provide plane surfaces free from depressions, indentations, or bulges which prevent draining when the pitch is not greater than 1" in 50". (Corners and rims of perforated skimmers should be adequately reinforced to prevent damage from handling during cleaning and bactericidal treatment.)

(7) The product-contact surfaces shall be constructed of not less than 16 U.S. standard gage stainless steel or equivalent material. The perforations or slots in the strainer shall be at least ¼" in diameter (dimension A, Fig. 1) and not more than 1¼" apart (dimension B, Fig. 1).[5] The strainer area shall have no perforations within ½" of the edge (dimension C, Fig. 1).[4] After perforations, the flat surface of the sheet from which the perforating punch or drill emerges on the down stroke shall be polished to the equivalent of not less than a No. 4 mill finish. No bracing for the skimmer or the skimmer support stand shall block any perforations unless the brace is made of corrosion-resistant material and fabricated in a manner suitable for a product-contact surface, and unless it can be readily removed for cleaning. A minimum of 3½" shall be provided between the strainer and the top of the skimmer (dimension E, Fig. 1).

(8) Legs shall be smooth with rounded ends, and have no exposed threads. If legs are of hollow tube stock, they shall be effectively sealed.

(9) A minimum vertical clearance of 2" shall be provided between the perforated skimmer area and the drainage funnel. (Dimension D, Fig. 1).

(10) There shall be no threads on product-contact surfaces except as provided for in the 3-A Sanitary Standards for Fittings.

(11) The funnel drain shall have a discharge opening of a size sufficient to discharge the drainage without pooling above, and be not less than equivalent to a diameter of 4". The funnel drain shall terminate in a free discharge, a distance of at least 6" above the floor or the drain connection if located at a higher elevation than the floor.

(12) Frames, frame legs, and supporting edge for the skimmer shall have:

(a) Structural parts not in contact with the product, and parts constructed with a smooth finish so as to be readily cleanable.

(b) Self-draining exterior surfaces.

(c) A minimum of 6" of space between the lowest part of the frame and the floor to provide ready access for cleaning legs and feet and those parts not readily removable.

(13) The frame shall provide continuous support for the outside edge of the skimmer strainer.

(14) The receiving-container shelf under the skimmer chute, where provided as an integral part of the skimmer support frame, shall be constructed of nonabsorbent, corrosion-resistant material and located so that the receiving-container rim will be at least two feet above the floor.

(15) All seams in the funnel drain area shall be smooth and waterproof, and substantially as corrosion resistant as the parent metal.

(16) There shall be no exposed bolts, screws, or rivets in the product-contact surfaces.

[4] Sanitary standards describing the construction of valves, fittings, and pumps may be obtained from International Association of Milk and Food Sanitarians, Inc., Box 347, Shelbyville, Indiana.

[5] Skimmer size: The Food and Drug Administration definition and standard of identity for raw oysters states in part: "The oysters are drained on a strainer or skimmer which has an area of at least 300 square inches per gallon of oysters drained, and has perforations of at least ¼ of an inch in diameter and not more than 1¼ inches apart, or perforations of equivalent areas and distribution. (Definitions and Standards under the Federal Food, Drug, and Cosmetic Act, Title 21, Part 36, *Federal Register*, August 27, 1946)."

RETURNABLE SHIPPING CONTAINERS

A. Material

(1) All metallic product-contact surfaces shall be of A.I.S.I. type No. 302 stainless steel or Aluminum Association type No. 5052–0 alloy, or equally corrosion-resistant metal that is nontoxic. If constructed of stainless steel, the containers shall not be constructed of less than 20 gauge material. If constructed of aluminum alloy the material shall not have a thickness less than 0.064 inches.

(2) All nonproduct-contact surfaces shall be of corrosion-resistant material, and shall provide a smooth, cleanable, and durable surface.

B. Fabrication

(1) All product-contact surfaces shall be at least as smooth as a number 4 mill finish on stainless steel, or equivalent surface finish on aluminum.

(2) All internal angles of 135° or less on product-contact surfaces shall have minimum radii of ¼ inch.

(3) There shall be no seams, crevices, or other openings within the food-contact surfaces.

(4) The container rim shall be rolled so as to permit easy and complete cleaning. The bead shall either be an open type with an external radii of not less than 3/16 inch or a sealed closed type.

(5) The container lid shall be so constructed as to afford easy and complete cleaning, shall be reasonably tight fitting, and a lip shall extend at least one inch down the outside of the container. Provisions shall be made for sealing the container so that any tampering will be evident.

(6) Handles shall be provided on 5-gallon or larger containers. The handles shall be considered as a nonproduct-contact surface.

SHUCKING BUCKETS AND PANS

A. Material

(1) All metallic product-contact surfaces shall be of A.I.S.I. type No. 302 stainless steel or Aluminum Association type No. 5052–O aluminum alloy, or equally corrosion-resistant metal that is nontoxic. If constructed of stainless steel, the buckets shall not be constructed of less than 22 gage material and the pans shall not be constructed with less than 24 gage material, or if constructed of aluminum alloy, the material shall not have a thickness less than 0.064 inches.

(2) All nonproduct-contact surfaces shall be of corrosion-resistant material, and shall provide a smooth, cleanable, and durable surface.

B. Fabrication

(1) All product-contact surfaces shall be at least as smooth as a number 4 mill finish on stainless steel or equivalent surface finish on aluminum.

(2) All internal angles of 135° or less on product-contact surfaces shall have minimum radii of ¼ inch.

(3) The shellfish shucking bucket shall not exceed a nine-pint capacity, except for the soft clam (Mya arenaria) shucking pan which shall not exceed a four-pint capacity.

(4) There shall be no seams, crevices, or other openings within the food-contact surfaces, except that two holes 180° apart shall be permitted in the side of each bucket near the top to accommodate a removable ball-type handle.

(5) The container rim shall be so constructed as to afford maximum strength and protection against damage, and shall be so rolled as to permit easy and complete cleaning. The bead shall be open type with an external radii of not less than 3/16", or a sealed closed type.

(6) The bail, if provided, shall be considered as contact surface and subject to material specifications as outlined in paragraph A of this standard. The bail shall be not less than 3/16" in diameter; it shall be so constructed that it will be held into place by spring tension. The bail shall be so constructed that it can be easily removed from the shucking bucket for cleaning purposes.

APPENDIX A

SKIMMER DESIGN DETAIL

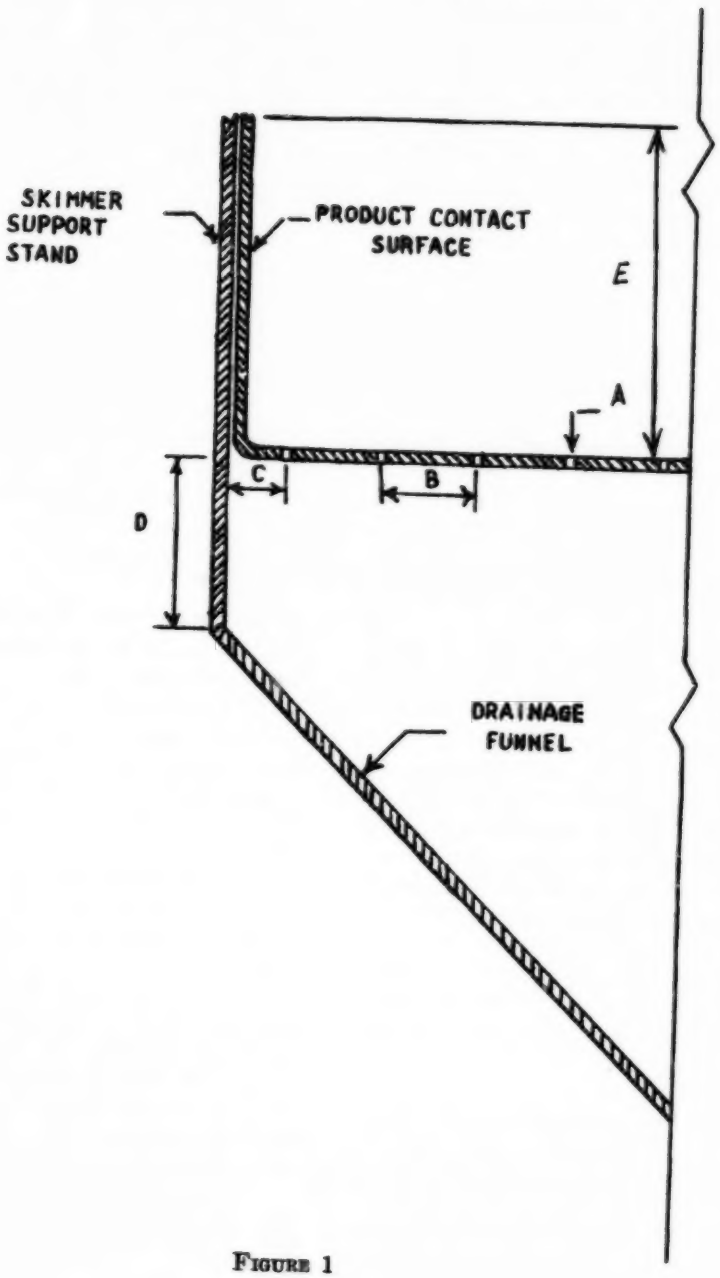

FIGURE 1

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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